

IS ANDROGEN DEPRIVATION THERAPY EFFECTIVE IN THE TREATMENT OF SEX OFFENDERS?

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We review the effects of androgen deprivation on the sexual behavior of human males. Although eunuchs have existed in many cultures over the last 4,000 years, there is scant detailed and specific information in the historical record about castration status and sexual behavior. From the literature on modern-day eunuchs who are not sex offenders, we conclude that androgen deprivation reduces sexual desire and behavior, including sexual intercourse. Most men, especially those who did not volunteer for the treatment, experience the side effects as extremely bothersome. Androgen deprivation therapy (ADT) receives endorsements from some clinicians who treat sex offenders, and it probably reduces sexual recidivism among men who freely request the procedure, but good evidence is sorely lacking. Men who freely request and persist with ADT are probably an especially low-risk group. Little is known about the effects of sexual or violent recidivism among sex offenders who do not freely request it. Little is known about the long term effects of ADT on sexual behavior in general, and sexual recidivism in particular, or about long-term health effects. Clearly, much more research is needed before ADT has a sufficient scientific basis to be relied upon as a principal component of sex offender treatment.

Keywords: androgen deprivation, sex offenders, treatment, castration

Androgen deprivation therapy (ADT) is treatment to suppress the production or action of male hormones, primarily testosterone. Based simply on the conclusion sections of several articles reviewing ADT for sex offenders, one would conclude there is sufficient scientific evidence to recommend it. For example, Bradford (2000) stated “The treatment of paraphilias using pharmacological agents . . . is effective in all types of sexual deviations, including the simultaneous presence of multiple deviations. In addition, it is the treatment of choice for the most serious sexual deviations . . .” (p. 249). Lösel and Schmucker (2005) reported a meta-analysis of treatment for sex offenders and concluded that, “The average effect of physical treatment is much larger than that of psychosocial programs. The main source for this difference is a very strong effect of surgical castration, although hormonal medication also shows a relatively good outcome” (p. 135). Similarly, Rösler and Witzum (2000) stated, “Long-acting GnRh agonists, together with psychotherapy, are highly effective in controlling selected paraphilias (pedophilia, exhibitionism, and voyeurism) and are the most promising mode of therapy in the next millennium” (p. 43). They also stated, “In light

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of the high effectiveness and low recidivism rate, it will not be surprising if a 'comeback' to surgical castration will occur" (p. 52).

Indeed, a survey of clinical opinion about the treatment and management of sex offenders would lead a disinterested observer (or legislator or policy maker) to conclude that ADT has been clearly demonstrated to decrease the subsequent community risk of sex offenders. While many authorities acknowledge that the empirical evaluation literature leaves much to be desired, they clearly imply that problem lies in the quality of the studies, not in the real potency of the interventions (Bender, 2007; Berlin, 2005; Fedoroff, 2008; Gijs, 2008; Krueger & Kaplan, 2002; Polak & Nijman, 2005; Rösler & Witzum, 1998; Saleh & Berlin, 2003; Saleh & Guidry, 2003; Schober et al., 2005). These beliefs are likely because of positive proximal indicators (such as circulating testosterone levels and patients' self-reports about libido). The purpose of this article is to examine what can be learned about ADT as a method to reduce recidivism among sex offenders by combining insights from historical and contemporary literature on eunuchs, medical literature on the use of ADT for prostate cancer, and the scientific evidence regarding ADT for sex offenders.

Testosterone, Sexual Development, Aggression, and Androgen Deprivation

The following provides only a brief primer on the above topics to equip nonspecialists with the knowledge and terminology required to follow the remainder of this article (more detailed accounts may be found in Anis, 2007; Dabbs & Dabbs, 2000; Levay & Baldwin, 2009; and Vogel, 2007).

Androgen is the generic term for any compound that stimulates or controls the development of male characteristics in vertebrates. The principal androgen is testosterone, which, in males and females, can be converted to estrogen, the most abundant female sex hormone. Testosterone first appears in utero where, if at sufficient concentration during the middle third of pregnancy, it transforms a neutral fetus into a male. As well as determining biological sex and its associated differences, the amount of testosterone affects the degree of masculinity within each sex. Fetal testosterone has enduring effects by stimulating the development of receptors that allow the body to respond to testosterone throughout life. Boys have more testosterone than girls before birth, and during the first few months of life, after which sex differences in testosterone levels are minimal until puberty. By the end of puberty, males have testosterone levels eight to ten times as high as females, and then testosterone begins a slow decline from a high of roughly 1000 ng/dl (nanograms per deciliter, as measured from serum) in late adolescence to roughly 450 ng/dl by age 80 (for men in the United States; Dabbs & Dabbs, 2000). There is a wide and unexplained variation among men in different countries and even among men of the same age in the same country. Interestingly, men and women become more alike in many ways as they age, not because male testosterone levels approach those of women, but because women drop in estrogen more than in testosterone, and the ratio of estrogen to testosterone matters more than the absolute levels of either. Testosterone production is controlled by the hypothalamus, which signals the pituitary gland whenever serum testosterone in the bloodstream drops below its set point. In men, the pituitary signals the testes

to produce testosterone. In both sexes, this pituitary signal also causes adrenal glands to produce smaller amounts of testosterone.

Testosterone is related to aggression among humans, but the relationship is small (Archer, Graham-Kevan, & Davies, 2005; Book & Quinsey, 2005). These same studies report that, among adult and adolescent males, the small effect becomes even smaller over the age of 35. Testosterone does not seem to be related to aggression among adult males with personality disorder (Coccaro, Beresford, Philip, Kaskow, & Geraciotti, 2007), and, among males in general, may be more related to dominance than aggression (Mazur & Booth, 1998). There have been very few studies of the relationship between testosterone levels and sexual aggression specifically. However, there is some evidence that the level of intrusiveness of sex offenses is related to offenders' testosterone levels (Studer, Aylwin, & Reddon, 2005). Nevertheless, most sex offenders have normal levels of testosterone (Bradford & McLean, 1984; Rösler & Witzum, 2000; Studer et al., 2005). Of course, this does not mean that lowering their levels to far below normal could not reduce recidivism, and we will review the evidence about this later.

Androgen deprivation can be accomplished both surgically and pharmacologically. Surgical castration (also called orchiectomy) is the irreversible removal of the testes. The appearance of a normal scrotum can be preserved through the use of cosmetic implants (e.g., Chiou, 1990). Pharmacological or chemical castration involves the administration of anti-androgens – drugs that interfere with androgen production or effects. The most commonly used are cyproterone acetate (CPA), medroxyprogesterone acetate (MPA), and leutinizing hormone releasing hormone (LHRH) agonists (or, synonymously, gonadotropic-releasing hormone or GnRH agonists). Each works somewhat differently. CPA competes with testosterone at androgen receptors in the brain, including the pituitary, thus interfering with the system that detects decreasing levels of circulating testosterone, thereby reducing its production by both the testes and the adrenals. MPA is a potent progestinal agent (causing increases in circulating progesterone) and is commonly used as a female contraceptive and to treat endometriosis. In men, it reduces the production of testosterone by the testes, and boosts the metabolic clearance of testosterone by the liver, thereby reducing circulating levels (Bradford, 2000). LHRH agonists overstimulate and exhaust the hypothalamic pituitary axis, thereby lowering the production of testosterone by the testes and adrenals (Bradford, 2000; Hill, Briken, Kraus, Strohm, & Berner, 2003).

We now turn to a review of the historical and contemporary nonempirical literature about androgen-deprived men to examine whether it is informative about whether androgen deprivation therapy is likely to be useful in the treatment of sex offenders.

Eunuchs in History

The term “eunuch” almost always refers to a man whose testes have been removed, either before or after puberty. Sometimes eunuchs also underwent partial or complete removal of the penis. Rarely, the term has also been used to refer to men who were impotent or celibate. By the year 200, the Byzantines used the term to refer to any man incapable of reproduction, whether castrated, born without adequate reproductive organs, or sterile because of injury.

Though the serious study of eunuchs in history is relatively new, eunuchs have existed for at least 4,000 years in several cultures in a variety of social identities. In China, men became eunuchs involuntarily by being captured, as a criminal penalty, or to fill servant quotas from some provinces. Others were castrated voluntarily or by their families in hopes of finding wealth or power in the palaces. Some were castrated as young children, but others as adults. The historical record of eunuchs in China supports the view that eunuchs wanted to be and were referred to as males, wore male clothing, and apparently had no change in their (almost always exclusive male) gender identity after castration. Although almost nothing is known about their sexuality, it apparently remained male and heterosexual (Jay, 1993). Throughout the Greek and Roman empires, "Clearly eunuchs were widely perceived as neither chaste nor celibate, but highly sexual and sexed beings" and "The reputation of eunuch sexual promiscuity extended to include giving sexual pleasure to their mistresses" via "oral and digital stimulation, but also included . . . the suspicion of penetration" (Hester, 2005, pp. 23–24). In Byzantine and similar early societies, eunuchs were considered to constitute a "third gender" (Ringrose, 2003). As early as the ninth century, an Islamic writer commented: "The eunuch is beloved and even sought out by women for the indescribable voluptuousness with which he provides them . . . the eunuch becomes less fatigued during intercourse (which is one of the secrets of his longevity), and thereby satisfies the women much more" (al-Jahiz, circa ninth century, paraphrased by Cheikh-Moussa, 1982). In the eleventh century, Theophylaktos of Ohid, a respected writer and churchman of his era, reveals in two of his poems that there were conflicting opinions about the institution of eunuchism and eunuchs at that time. In one poem, he reveals a dislike for eunuchs who were sexual predators and who used castration as a way to facilitate sexual activity (Ringrose, 2003).

Until recent times, Italian Castrati played an important role in religious and operatic music by having their testicles removed before age 10 so as to preserve soprano voices. Most could, and many apparently did, experience virtually normal sexual relations, being capable of erection and the emission of prostatic fluid (Barbier, 1996). Many Castrati were celebrities pursued as sexual partners by women (Aucoin & Wassersug, 2006).

Since the second century BCE, a religiously-based cult in India known as hijras have practiced self-castration, ostensibly to demonstrate the depth of religious commitment. Traditionally, they were believed to have the power to confer fertility on newlyweds and newborns and supported themselves by singing and dancing at weddings and celebrations. More recently, hijras also engage in prostitution. While ideally, hijras are ascetics who undergo excision of the penis and testicles in order to be free of sexual desire, the current reality seems to be that excision of the sexual organs is not absolutely essential and most are sexually active, engaging in the role of penetrated rather than penetrator in sexual encounters. Mostly they dress as women, are known as a "third sex", and are marginalized members of Indian society (Reddy, 1992).

To summarize, eunuchs have existed in many cultures over the past four millennia, and some held positions of power and wielded considerable influence. Some were asexual, but some remained sexually active in various ways throughout life. It is difficult to draw firm conclusions from this literature for the question

of ADT for sex offenders, however, because there is scant specific and detailed information about castration status and subsequent sexual behavior. However, it is obvious that eunuchs were viewed as distinctly different from both males and females, that castration was often imposed as punishment or as a means of subjugation, and that only a minority chose true castration voluntarily. On the other hand, there is the clear suggestion that, perhaps due to strong expectations, some eunuchs remained sexually active through their subsequent lives.

Contemporary Eunuchs

There are two main sources of information about androgen-deprived men in modern Western societies—eunuchs by choice, and men who undergo androgen deprivation as treatment for prostate cancer. Because there has been some scientific study of each group, it is possible to provide a more detailed summary of what is known about them. Perhaps surprisingly, there is a Eunuch Archive Web site (<http://www.eunuch.org>), as well as others designed to serve men who have chosen or are considering castration. Johnson, Brett, Roberts and Wassersug (2007) posted a questionnaire on the Eunuch Archive Web site to learn about the voluntarily castrated men and received replies from 92 surgically castrated and 43 chemically castrated men.

The motives for the procedure, in rank order, included the reduction of libido, cosmetic appearance, paraphilic sexuality (e.g., apotemnophilia, an obsessive sexual interest in the removal of a healthy body part), male-to-female transition, to prevent sexually offensive behavior, health concerns, and to please a partner. Brett, Roberts, Johnson, and Wassersug (2007) conducted a further study of the 92 voluntarily surgically castrated men, and interviewed 19 of them. More than half of the men reported that the most appreciated aspect of orchiectomy was the sense of control over sexual urges and appetites. In general, the participants reported high self-rated sociability, and mental and physical health. Few (11%) identified themselves as eunuchs to family, 15% told no one, and only 5% publicly identified themselves as eunuchs. Regrets concerning castration mostly concerned the loss of sexuality (48%), but the level of regret was generally quite low (only 17% reported having regrets rated more than 5 on a scale of 1 to 10), and the mean level of regret was only 2.6. Of the participants (mean age = 47), 63% stated their self-identified gender was male, 12% said female, and 24% said it was a third, other, or neither gender. Interestingly, 60% took supplemental estrogen or testosterone to counteract the side effects of androgen deprivation. Among those not taking hormonal supplements, the rating of sexual desire (on a scale of 0 to 10 where 0 = *none* and 10 = *overwhelming*), was 3.5, and on a similar scale of sexual activity (0 = *low*, 10 = *lots*), the mean was 2.8. Both were significantly lower than the scores for men taking some form of hormonal supplements. Of interest, the scores for men who reported taking minimal doses of testosterone were no different than those taking full replacement doses. Among the entire group of 92, the most common side effects were loss of libido (reported by 66% of participants), hot flashes (63%), and genital shrinkage (55%). Other side effects included weight gain (48%), body hair loss (48%), gynecomastia (46%), depression (35%), impaired short-term memory (22%), and osteoporosis (11%). However, when asked which side effects were most bothersome, hot

flashes received the highest rating (42%), followed by weight gain (29%) and depression (21%).

Participants were asked whether they experienced any of several mental disorders before or after castration. With respect to depression, it is of interest that self-reported major depression was unrelated to the castration itself and significantly fewer men reported experiencing minor depression after, compared with before, castration. It may be that the men who reported bothersome depression after castration were systematically different from the men who reported experiencing minor depression before surgery. It is also of interest that significantly fewer men self-reported that they experienced obsessive-compulsive disorder after castration (9%) than before (22%). Brett et al. (2007) suggested that the androgen deprivation resulting from the surgery eliminated the libido that was driving the sexual obsession associated with a castration paraphilia. They also stated that their data had "implications to sexual predators and other individuals who have committed, or fear committing, sexually offensive behavior" (p. 952). They also concluded that their data supported the view that androgen deprivation can reduce some sexual obsessions. Side effects of castration most appreciated by their participants were (in rank order) a sense of control over sexual urges and/or sexual appetite (52%), a feeling of calm (46%), cosmetic effect (39%), allowing the respondent to be more submissive (26%), release of the pressure to be macho (26%), freedom from guilt about sexual thoughts and desires (24%), and facilitation of sex reassignment to female (25%).

Although interesting, it is unclear how much these results pertain to the question of ADT for sex offenders, because the men were a highly selected sample and all chose to be castrated without the coercion that would be required for most sex offenders. Nevertheless, such "voluntary" eunuchs generally regard the treatment positively, especially with respect to achieving sexual objectives, many of which are atypical of heterosexual men. It is, of course, difficult to know how much of this satisfaction derives from obviously powerful expectancy or placebo effects.

Aside from men who freely choose castration, the other main group of contemporary eunuchs comprises men who undergo castration as part of their treatment for prostate cancer. Androgen-deprivation therapy via surgical or chemical castration is the most common medical treatment for advanced prostate cancer (Rackley, Clark, & Hall, 2006), which affects about 70,000 men annually in the United States (Matthews, 2007). It is generally agreed that it is important that castrate levels (<50 ng/dL) of serum testosterone be achieved. Men who undergo such treatment can be distinguished from those discussed in the previous paragraph because these are very unlikely to have freely chosen it in the absence of medical necessity. Thus, one might think much could be learned about castration for sex offenders by studying them. However, application to sex offenders is limited by the fact that men receiving such therapy are often elderly (with a mean age over 70 years in most studies, and with few as young as their early 50s). In addition, ADT is usually combined with other treatments (usually prostatectomy), which have their own effects.

Fowler, Collins, Corkery, Elliot, and Barry (2002) examined the quality of life of prostate cancer patients who had undergone ADT. Of 300 men treated with ADT, 108 had undergone orchiectomy and 192 chemical castration. The com-

parison participants were 1,095 non-ADT prostate cancer patients. All of the men in both groups had undergone radical prostatectomy several years earlier, a procedure which itself causes at least temporary erectile problems; and after which only 50% to 75% of patients ever regain the ability to have erections. The mean age of the participants was approximately 75 years. Only 2% of the 300 ADT patients reported sexual intercourse in the previous month, compared with 12% of the controls. Most of the ADT participants (69%) reported no days of feeling sexual desire in the past month, compared with 29% of the controls. Similarly, 72% of the ADT men reported no erections since their surgery compared with 55% of the controls. Only 2% of the ADT participants reported erections firm enough for intercourse compared to 12% of the controls. The ADT men also had more concerns about their muscle tone and appearance and were more likely to report feeling that their bodies were soft and flabby. They reported lower energy and activity levels. They also reported more general health problems (e.g., aches, pains, illnesses, fears about health) and more mental health problems (e.g., unhappiness, nervousness, downheartedness).

In another study, Navon and Morag (2003) conducted in-depth interviews with 15 patients with advanced prostate cancer who had been undergoing ADT (LHRH agonists and/or antiandrogens) for periods from 6 months to 3 years. Of these, six had also had prostatectomy, and five had had radiation. The mean age was 70 years. In general, the men said that prior to therapy they put a high premium on having a manly appearance by watching their weight, engaging in sports, and being well dressed. Before ADT, they reported that they believed they could overcome its side effects by employing their manly traits of determination and courage. Contrary to expectations, however, they reported the following experiences after ADT: decreased penis size, less body hair, breast development, gaining weight around the buttocks and thighs, and hot flashes. They generally tried to conceal their bodily changes and tended to avoid certain situations (e.g., beaches). At first, they downplayed effects on sexual function expecting it to be temporary, or that sex would be enjoyable without an erection. However, they soon discovered that castration deprived them of libido, erotic dreams and fantasies, and their general capacity for excitement and enthusiasm. Many said that prior to therapy, sex was their main source of pleasure and was the driving force behind their pursuit of companionship and success. In general, after castration they tried to be masculine by engaging in male-oriented sexual jokes, and chose not to disclose their castrated status to anyone but their spouses.

Here are excerpts from two interviews that give a sense of the disadvantages reported for castration:

My mental and physical vigor had deserted me. My previous ability to move mountains had disappeared. I started feeling that from now on I was doomed to living with disability . . . I started developing breasts and gaining weight, particularly in the backside, like a woman. My penis has shrunk, it's dead in fact. It's lost between my thighs, which have grown enormous. Aesthetics is very important to me, so since the treatment, I started feeling self-aborrence. Hot flashes have set in, like in menopausal women . . . I feel revolted, it's dirty and unpleasant. It makes me feel different from other people. I find it hard to look at my body. It makes me hate myself. (Navon & Morag, 2003, p. 1382)

and:

The treatment robbed me of what I loved best in the life – sex . . . Initially, I still hoped I could at least fantasize about sex, but everything, even my erotic dreams, had vanished. Everything in me became numb, my penis, my lust for women, by drive to masturbate. Nothing excites me anymore. Without sex, my world has grown boring, gray, and mechanical . . . I lost the capacity to enjoy trips, music, food, even the fragrance of spring. For many months already, my whole existence lacks any enjoyments . . . The sparkle of things has vanished. (p.1384)

On the other hand, although by far in the minority, some patients spoke positively:

In the past, my wife was suffering because of my sexual demands. We had many arguments about it, and there was a lot of tension at home as a result. Only after I moved into my own room, I got rid of my former guilty feelings about this matter. Now, when each of us has our own room, the quarrels are over and my wife's happy. When I compare the situation now with that it used to be, it's clear that, at the end of the day, this change in our relationship has improved something in my personality. (p.1387)

Interestingly, Warkentin, Gray, and Wassersug, (2006) outline the case of a man who had had a prostatectomy and also received Lupron; he had castrate testosterone levels. Largely to please his wife, he said, he was interested in whether there was any device available that would help him to have satisfying sex. A strap-on prosthetic was devised and the patient claimed it allowed him satisfying, multi-orgasmic sex. He stated “. . . my orgasms are less anatomically focused, radiating across my pelvis. They are of variable intensity, but sometimes massively cathartic” (p. 392).

In summary, what can we learn from the literature on modern-day eunuchs? The few conclusions are similar to those based on eunuchism through history: First, castration, whether surgical or chemical, clearly reduces sexual desire in most, if not all, men. However, it is just as clear that it does not necessarily eliminate sexual behavior, nor render all men incapable of sexual intercourse. Just as clear is that surgical and chemical castration have many side effects that are extremely bothersome to many men, especially those who do not voluntarily choose it.

A more fundamental question, relevant to ADT as a technique to lower the risk of sex offenders, pertains to the distinction between the direct effects of ADT compared with the independent effects of expectancy. Because every man who has experienced ADT (or castration) knows he has, some of its effects might be because of his expectations about its effects (as opposed to the direct effect of lowered testosterone, *per se*). Such expectancy might account for the fact that some historical eunuchs evidently led sexually active lives, including coitus. Similarly, perhaps contemporary “voluntary” eunuchs report satisfaction with ADT because they expected to be pleased with the results. Such expectancy (or placebo) effects can be very powerful and could just as plausibly yield positive effects (compared to more direct physiological causes) of ADT on the recidivism of sex offenders. And, of course, expectancy and more direct physiological effects could operate simultaneously.

The prostate cancer literature includes one randomized placebo-controlled study of ADT (Alberts et al., 2006); a design which permits the separation of expectancy effects compared to drug effects. Alberts et al. investigated the effects of an antiandrogen (flutamide) in the prevention of prostate cancer among men with premalignant warning signs. Using a double-blind design, 60 men were assigned at random to receive either flutamide capsules or identically-appearing placebo capsules daily for one year. The results showed no effect of the ADT in preventing prostate cancer, as well as no effect on general quality of life measures. The ADT group experienced significantly greater toxicity (gynecomastia, breast tenderness, diarrhea). Interesting, there were also no significant differences between groups in impotence or reduction in libido, suggesting a possible placebo or expectancy effect.

We turn now to an examination of evidence that ADT reduces the risk posed by sex offenders.

ADT for Sex Offenders

We began this article with summary statements from articles reviewing ADT for sex offenders. Here, we undertake our own review. Although a meta-analytic review might offer the best chance of providing an unbiased estimate of the efficacy of ADT treatment, such a meta-analysis is not yet possible. Unfortunately, as we have reviewed elsewhere (Rice & Harris, 2003), the empirical studies of sex offender treatment have generally been methodologically weak, and the studies of recidivism following surgical and pharmacological treatments have used the weakest designs of all (see also Lösel & Schmucker, 2005), often failing to include even a comparison group of sex offenders not exposed to ADT. Next, we briefly review all studies we could find of surgical and pharmaceutical ADT that did use such a comparison group.

All of the studies of surgical castration (Cornu, 1973, reported in Heim & Hirsch, 1979; Stürup, 1968; Stürup, 1972 [see also Hansen & Lykke-Olesen, 1997]; Wille & Beier, 1989) compared men who volunteered for the treatment when offered with men either not offered the treatment or who refused. It is now generally agreed among researchers that these evaluation designs are uninformative about the specific effects of treatment (Hanson et al., 2002), because treatment itself and pretreatment selection are hopelessly confounded.

Despite methodological shortcomings, it is instructive to consider some findings of studies of surgical castration. Stürup (1968) compared 18 castrated and 18 noncastrated men, all of whom were classified as "rapists" of adults or children. The castrated men had volunteered for the treatment, whereas the noncastrated men had not. After a follow-up of approximately 15 years, one of the castrates was charged with a new sex offense (after obtaining testosterone), compared with three comparison subjects. Clearly, surgical castration did not guarantee absence of re-offending. In fact, the sexual recidivism rates for surgically castrated sex offenders in the studies summarized by Heim and Hirsch (1979) and Wille and Beier (1989) ranged from less than 3% in a mean follow-up of approximately ten years (Langelüddeke, 1963, reported in Heim & Hirsch, 1979) to 11% in four years (Heim, 1980, as cited in Heim, 1981, and in Wille & Beier, 1989). Contrary to some more recent review articles, Heim and Hirsch

(1979) concluded on the basis of the studies they reviewed that there was no scientific basis for surgical castration in the treatment of sex offenders.

All of the recidivism studies reporting favorable results regarding pharmacological ADT (except possibly one which we describe below), have compared volunteers with refusers (Emory, Cole, & Meyer, 1992; Fedoroff, Wisner-Carlson, Dean, & Berlin, 1992), again confounding treatment itself with pretreatment selection. All remaining studies of pharmacological ADT (all used MPA) have reported the absence of a treatment effect compared with other treatments (Hucker, Langevin, & Bain, 1988; McConaghy, Blaszczyński, & Kidson, 1988; Langevin et al., 1979; Maletzky, 1991). The study by Hucker et al. (1988) is particularly noteworthy because it was an attempt at a random assignment placebo design. However, of 100 child molester referrals, only 48 admitted to their offenses and completed an initial assessment. Only 18 of these agreed to take part in the study, which involved either ADT or placebo. Only 11 completed the 3-month trial (five experimental and six comparison participants). There was evidence that those on MPA showed reduced testosterone and sexual fantasies compared to those on the placebo. However, there was no evidence that MPA changed their sexual performance (frequency of masturbation, frequency of orgasm, level of erection) which decreased in both conditions, perhaps, the authors speculated, as a result of expectancy effects. Moreover, the men for whom MPA most reduced sexual fantasy were also the most likely to drop out.

A study by Maletzky, Tolan, and McFarland (2006), using MPA deserves mention because the treated men were under considerable coercion to accept ADT. These men were incarcerated in Oregon which has legislation specifying that sex offenders deemed appropriate (i.e., at sufficient risk of sexual recidivism) can be ordered to take MPA as a condition of release. As of 2004, 274 inmates had been evaluated and 134 deemed appropriate. Of those, 70 received MPA and 55 somehow managed to obtain release without it. Unfortunately, no empirically validated risk assessment was used to assign ADT. Instead, a medical practitioner made the determination on the basis of clinical judgment. After a follow-up of approximately 2.5 years, those who received ADT had significantly fewer recorded criminal offenses than those in either of the two groups not receiving MPA, and none of the ADT cases had a recorded sex offense. The two groups of comparison participants exhibited similar rates of officially detected sexual recidivism (18% among those recommended for treatment but not receiving it, compared with 15% among those not recommended). Based on the information available, however, it cannot be determined whether the three groups were equivalent in pre-treatment risk. Although the legislation intended that ADT go to those of higher risk, this evidently did not occur, at least among those who did not receive treatment—the recidivism rate for those deemed appropriate who avoided treatment was essentially the same as that of the men deemed not to require it.

Another study of ADT deserves mention. Hansen and Lykke-Olesen (1997) reported an investigation of 22 men in a Danish forensic psychiatric hospital who had been the subjects of earlier studies and who had refused surgical castration before 1970 (when it was discontinued as a sex offender treatment in Denmark). By 1987, three of the 22 men had received CPA. Of these, two committed a new sex crime after beginning treatment (including a sexual murder), compared to two of the 19 men not receiving ADT. Hansen and Lykke-Olesen also stated that, with

continued CPA treatment, serum testosterone sometimes normalized after one or two years. Because of this, LHRH agonists have more recently supplemented CPA. They state that the LHRH analog alone would have been sufficient to achieve a lasting reduction of testosterone production, but CPA was also administered because (unlike MPA or LHRH agonists) CPA blocks peripheral receptors ensuring testosterone levels remain low even if offenders illicitly procure testosterone or other steroids. Of 33 men referred since 1989 for the combined treatment, 30 agreed to start, but six quit before release. Of the 24 men at risk (some of whom were still in prison, but had some community privileges), 19 remained in treatment at the time of the study and none of these had a new detected sex offense; all were under ongoing supervision. The five remaining men no longer under any supervision all stopped taking the medication and one exhibited sexually violent recidivism after 2.5 years without treatment and community supervision.

There have also been two other studies of pharmacological ADT that did not study recidivism, but did use stronger designs than other studies of ADT. A study by Bradford and Pawlak (1993) examined 19 sex offenders who volunteered for a 13-month study in which they were randomly and double-blindly assigned to placebo or CPA for 3 months following a one-month no-treatment baseline phase. They were then assigned the alternate treatment for three months, and then the treatments were repeated. Although CPA significantly lowered androgen levels compared to placebo, there were no significant differences between CPA and placebo on measures of sexual arousal or self-reported sexual behavior. In the other study (Schober et al., 2005) five male pedophiles volunteered for a study of the effects of cognitive-behavioral psychotherapy with or without the addition of an LHRH agonist. Each participant served as his own control. Results showed that during ADT, testosterone levels achieved castrate levels. Overall, phallometric responsivity was lower, and self-reported pedophilic fantasies, urges and masturbation were reduced. However, pedophilic preferences were unchanged.

Finally here, we note a study by Hanson and Harris (2000) who compared 208 sex offender recidivists to 201 matched nonrecidivists after a short mean period of community release. Although the matching did not eliminate all effects of prior risk of recidivism, it was noteworthy that the recidivists were significantly more likely to have received ADT. Again, this study indicates that ADT cannot serve as a guarantee against sexually violent recidivism.

It is clear that much more research is required to evaluate the specific efficacy of pharmacological ADT. Indeed, there is as yet no compelling evidence that ADT does more good than harm for sex offenders. As we have seen, the research is quite clear that ADT reduces sexual desire, and this is often one of the objectives of ADT for sex offenders. On the other hand, as we discussed, there are a host of established harmful results. Known physical and mental health risks, for example, include increased risk of fractures and diabetes mellitus (by 40%–50%) and a smaller increase (10%–20%) in the risk of cardiovascular morbidity and depressive symptoms (Giltay & Gooren, 2009), as well as a number of other less serious well-documented risks. In their review of pharmacological treatments for sex offenders, Hill et al. (2003) made the following statement aptly summarizing the current state of affairs: “The optimal pharmacotherapy for paraphilias should (a) reduce selectively the sexual deviant behavior, impulses and fantasies; (b)

support or at least not impair nondeviant sexuality; and not cause other adverse side effects. It is no secret that the development of such a pharmacological agent still appears more like a utopian than a realistic goal for the near future” (p. 408).

In conclusion, one must regard the professional literature as very curious. The outcome evaluation research is remarkably weak, so weak that, were the treatment not so plausible, it would have to be regarded as empirically unsupported. On the other hand, many respected and experienced clinicians, while acknowledging the weakness of the evidentiary basis, are strong proponents (e.g., Bradford, 2000; Rösler & Witztum, 2000). As is the case for sex offender treatments more generally (Hanson, personal communication, 2010; Seto et al., 2008) forensic specialists and researchers have argued for randomized control studies, especially (in the case of ADT) double-blind placebo controlled studies (Beech & Mitchell, 2005; Grubin, 2007). In the next section, we examine the legal and ethical arguments pertaining to such a study.

Legal and Ethical Issues

There are currently nine U.S. states (California, Florida, Georgia, Iowa, Louisiana, Montana, Oregon, Texas, and Wisconsin) and several other countries (e.g., Czech Republic, Poland) that have laws regarding chemical or surgical castration for sex offenders. Some countries that do not have laws specifically pertaining to ADT do have laws that permit compulsory pharmaceutical intervention (including ADT) when prescribed by a medical practitioner as part of a management strategy for offenders in the community (e.g., Canada).

The current castration laws in the United States (the first of which came into effect in California in 1997) have stood up to legal challenge despite much argument by legal scholars. It is of interest that laws must have been partly influenced by expert opinions that such treatment would be effective even though the major impetus may have been political—sex offenders, especially pedophiles, are reviled by much of the lay public, and politicians who push for such laws clearly gain political favor by doing so (Harrison, 2007). Nevertheless, the fact that such laws have withstood legal challenges to date does not mean that ADT is ethical, or, more to the present point, that a random assignment study using ADT would pass an ethics review.

Much has been written regarding the ethics and legality of ADT with sex offenders (e.g., Bailey & Greenberg, 1998; Harrison & Rainey, 2009; Hicks, 1993; Miller, 2003; Scott & Holmberg, 2003; Stinneford, 2006). Some of the above have argued strongly that ADT is unethical and the laws should be struck down (e.g., Stinneford, 2006). Key points raised by these authors are that, to be consistent with ethical principles, the goal of administration of ADT should be social control and/or individual therapy and not punishment; and that the decision as to whether ADT is appropriate should be made by a medical practitioner rather than a criminal justice official. These ethical concerns could be easily accommodated within the design of a random assignment study as we propose below. Other ethical concerns raised by those who have considered the matter are more difficult to accommodate in a random assignment study.

One such concern pertains to the requirement for free and informed consent. For ADT, informed consent would require that the offender be told what drugs are

being used, the length of time they will need to be taken, and the likely benefits and adverse side effects. As we have seen, the list of possible physical and psychological adverse side effects is long and it is difficult to imagine that very many offenders would freely consent to such a procedure. On the other hand, we have also seen that there are men who do freely choose the procedure, though it is not clear that they are completely informed of the possible adverse effects. Although some have argued that free consent is not possible under the condition that administration of the drug is a condition of prison release or probation supervision (see Harrison & Rainey, 2009 for an interpretation of the European Court of Human Rights), others have argued that noncoerced consent is still possible under such circumstances (Miller, 2003), or have presented arguments that there is no reasonable ethical objection to offering an offender the option of a shorter sentence with ADT (Bailey & Greenberg, 1998).

Another possible ethical concern pertains to whether ADT for sex offenders violates the basic human right to freedom from inhumane or degrading treatment. However, an analysis by Harrison and Rainey (2009), concludes that chemical castration is unlikely to be found to be inhumane or degrading, especially if the drug used is not MPA, if it is not administered for the rest of an offender's life, and if the offender can be shown to be of high risk. Other ethical concerns raised by Harrison and Rainey (2009) pertain to articles of the European Convention on Human Rights regarding respect for a person's family and private life, including the right to found a family. The authors' analysis of these issues suggest there are legitimate arguments both for and against the view that chemical ADT for sex offenders would be found by a court to violate these fundamental human rights.

A Randomized, Control Study of ADT for Sex Offenders

In our view, the fact that there is currently no solid evidence that ADT does more good than harm makes it entirely ethical to invite high risk incarcerated sex offenders, all of whom have been deemed by a physician to be suitable candidates, to volunteer to take part in a study in which they will be randomly assigned to one of two groups. One group would be administered ADT (which could be, as decided in advance by the investigators, either chemical or surgical) and will be released earlier than they otherwise would. The other group would not receive ADT and would not be released early. Others have argued there is no ethical problem with offering an offender a choice between a longer sentence and a shorter sentence with (surgical) ADT (Bailey & Greenberg, 1998). We see no ethical or practical problem with inviting offenders to volunteer for a study in which they could receive ADT in return for a shorter sentence. Ideally, offenders would be obliged to accept long-term follow-up supervision (incorporating unannounced measurement of serum testosterone levels) to maximize the likelihood of effectiveness and to compare the long-term health and recidivism outcomes. Only by conducting studies such as this will the true efficacy of ADT be determined. Although sex offenders could be assigned to these two groups at random, it is difficult to see how a double blind study (i.e., one in which neither clinicians nor patients know who receives active treatment) could be conducted. Nevertheless, there might be methodological value in prescribing a non-ADT drug for the control group, one that has clearly noticeable, but innocuous, side effects.

Half of the participants in each group could, at random, be given one of two expectancy sets. That is, half of the participants would be told they were receiving a drug that is known scientifically to abolish sex drive (via ADT or some fictitious means), while the other half would be told that no one really knows the effect of the drug on sex drive. During the follow-up, participants could be surveyed on the extent to which they believed the drug they received was decreasing their sex drive and risk of recidivism; and these ratings could be used as a covariate in analyses of outcomes. The point of these manipulations and analyses is to attempt to distinguish the effects of expectancy from the more direct physiological effects of ADT.

Summary

Although human physical castration has been performed for thousands of years, we can draw surprisingly few conclusions about its certain effects on recidivism among sex offenders. ADT receives endorsements from some clinicians who treat sex offenders (Berlin, 2009) and it probably reduces (but does not eliminate) sexual recidivism among men who freely request the procedure. However, good evidence is sorely lacking, especially as to how much of that reduction among willing volunteers is due to the effective reduction in circulating testosterone, rather than expectancy or strong motivation to desist from offending. It is clear that most men greatly dislike its psychological and physical effects. Little is known about its effects on sexual or violent recidivism among sex offenders who do not freely request it. Moreover, little is known about the characteristics of those who volunteer for (rather than refuse) ADT, especially such risk-relevant characteristics as psychopathy or high actuarial risk scores. Little is known about the long term effects of ADT on sexual behavior in general, and sexual recidivism in particular. Little is known about the long term health effects of ADT (c.f., Giltay & Gooren, 2009). Clearly, much more research is needed before ADT has a sufficient scientific basis to be relied upon as a principal component of sex offender treatment. We see no practical or ethical reasons, however, why such research cannot be conducted.

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